

Fundamental Diagnostic Hematology

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# Anemia



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# FUNDAMENTAL DIAGNOSTIC HEMATOLOGY

## ANEMIA

(Second Edition)

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## PREFACE

Anemia is the most common problem in medical clinics the world over and is of major public health importance. It is an important cause of chronic debility and thus affects social and economic well-being as well as physical health. With this in mind, the first edition of this book was published in 1983 at the request of the World Health Organization in collaboration with the U.S. Department of Health and Human Services. Its purpose was to help train hematology laboratory staff, especially those working in intermediate laboratories in developing countries, in the diagnosis of anemia. In the event, it has been found useful by technical and medical staff in provincial and central hospitals as well.

We have been grateful at the enthusiastic welcome given to it by individuals, by national health authorities and by the International Society of Hematology (ISH). With the support of that Society it was translated into Spanish. It has also been translated into Chinese, and has therefore served a valuable function in large areas of the world.

It is now timely to publish a second edition. In the past few years there have been major advances in our understanding of the pathophysiology of the functions of blood. There has also been an explosion in new technology: methods for analysis at a molecular level are now performed even in some "routine" laboratories, and equipment which was formerly considered to be highly specialized has become common place. A prime example of the latter is the blood cell counter which has replaced "manual" hemocytometry in many of the larger laboratories in developing countries. This development is taken into account; but essentially the approach to diagnosis is based on the needs of smaller laboratories which may not have sophisticated equipment but are required to make, and are capable of making, competent diagnostic decisions with the more limited resources available to them.

As reliable laboratory practice depends on a high standard of quality assurance, this has been emphasized and procedures for quality control are described for all the tests which are included.

The guiding principle in this book, therefore, has been to provide a practical approach with maximal use of simple tests. For this reason the usefulness of blood film morphology has been emphasized. Indeed, in many cases, measurement of hemoglobin and examination of a blood film can (with some training) provide all the information necessary for identifying the prevalent kinds of anemia of public health importance in an area. Bone marrow examination has been included because it can be done relatively easily by a physician, and can provide information about the iron status as well as morphological data needed for diagnosis.

Detailed discussion of the physiology and biochemistry of the red cell is beyond the scope of the book. However, brief comments are included because an understanding of normal red cell physiology is helpful for

correlating the morphological changes of the red cells and results of other basic tests with the causes of anemia.

The great importance of protecting the health of the staff who are involved in specimen collection and laboratory tests is recognized, and a chapter is devoted to laboratory safety, and to the prevention of biohazards and other risks in their work.

In preparing the previous edition we received greatly appreciated advice from the International Council for Standardization in Hematology (ICSH) and the ISH, as well as from individual colleagues who reviewed the manuscript. We also received subsequently valuable suggestions from users of the book in various countries, and from WHO Regional Offices, which have been taken into account in the revision. For this edition, we also received valuable technical assistance from Ron Nuse, Jennifer Cyphers, and the Technical Information Activity, Division of HIV/AIDS, National Center for Infectious Diseases, CDC.

Since this is essentially a practical book, no references have been given to the literature. Readers are referred to the many available textbooks (some of which are listed below), and to the various ICSH publications describing ICSH methods and reference materials referred to in the text. Reprints of these are available on request.

## **Selected Textbooks**

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